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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,871	12/03/2003	Seung Ho Hahn	20061/OF03P160	5405

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EXAMINER

KENNEDY, JENNIFER M

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 04/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,871

Applicant(s)

HAHN, SEUNG HO

Examiner

Jennifer M. Kennedy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/03/2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities: In line 8 of the claim, the examiner suggests replacing "and" with —than—in order to clearly compare the different thickness. Appropriate correction is required.

Claim 2 and 5 are objected to because of the following informalities: Claims 2 and 5 are awkwardly worded. The examiner suggests amending claims 2 and 5 to claim --- wherein the nitrogen ion-implantation is performed at an energy of 10 to 50keV.--

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsai et al. (U.S. Patent No. 5,648,287).

In re claim 1, Tsai et al. discloses the method of manufacturing a semiconductor device, the method comprising:

successively depositing gate insulating layer forming material (14) and gate electrode forming material (18) on a semiconductor substrate;

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patterning the gate insulating layer forming material and the gate electrode forming material to form a gate insulating layer and a gate electrode (see column 6, lines 24-27);

performing a nitrogen ion-implantation to a front face of the substrate (see column 7, lines 19-34); and

annealing the substrate so as to form a re-oxidation layer (36, 37) that has different thickness on the sidewalls (36) of the gate electrode and on the substrate (37, see column 7, lines 35-45).

In re claim 3, Tsai et al. discloses the method wherein the dose of nitrogen ion implantation is 10^{14} to 5×10^{15} atoms/cm² (see column 7, lines 27-30).

In re claim 4, Tsai et al. discloses the method wherein an angle of nitrogen ion implantation is vertical to the substrate (see column 7, lines 19-25).

In re claim 5, Tsai et al. discloses the method wherein the dose of nitrogen ion implantation is 10^{14} to 5×10^{15} atoms/cm² (see column 7, lines 27-30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 2 and 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al. (U.S. Patent No. 5,648,287) in view of Yoo et al. (U.S. Patent No. 6,486,039).


Tsai et al. discloses the method as claimed and rejected above, including wherein the energy of the nitrogen ion implantation is at an energy between about 30 and 70, however, Tsai et al. does not disclose the units of the energy applied. Therefore, Tsai et al. does not disclose the method wherein energy of ion implantation is 10 to 50 keV. Yoo et al. discloses the method of implanting nitrogen at an energy of between 10 and 30 keV. It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the nitrogen ion implantation of Tsai et al. at the energy at which Yoo et al. discloses since the energy range at which Yoo et al. implants is sufficient to change the oxidation rate of the underlying material (see Yoo et al., column 5, lines 4-37).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jennifer M. Kennedy
Patent Examiner
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